

Assessment Schedule – 2009**Statistics and Modelling: Calculate confidence intervals for population parameters (90642)****Evidence Statement**

Q	Achievement	Achievement with Merit	Achievement with Excellence	Judgement	Sufficiency
1 (a)	1257 ± 55.7 or $1201.3 < \mu < 1312.7$ $z = 2.58$ or 2.576 or 2.5758 (GC: $1201.3 < \mu < 1312.6$) Accept $[1200, 1300]$ a			Accept any rounding of at least 2 sig fig. Accept interval written in equivalent forms. Ignore units.	1(a) AND interval in 1(b) for Achievement.
1(b)	-76 ± 66.48 $z = 1.96$ or 1.9599 or $-142.48 < \mu_1 - \mu_2 < -9.52$ (GC: $-142.47 < \mu_1 - \mu_2 < -9.52$) Accept 76 ± 66.48 or $9.52 < \mu_1 - \mu_2 < 142.48$ (GC: $9.52 < \mu_1 - \mu_2 < 142.47$) Accept $[-140, -9.5]$ or $[9.5, 140]$ a	Since 0 is not in the interval produced, the decision is that it is very likely there is a difference in the weights of male and female kiwi, (based on these samples). m	<div>Excellence</div>	Accept any rounding of at least 2 sig fig. Accept interval written in equivalent forms. Suitable statement consistent with interval produced. Interval AND suitable statement needed for MERIT Ignore units.	ALL of 1(b) i.e. both parts for Merit.
1(c)	$5861.3 < T < 7348.7$ OR $[5900, 7300]$ for 1a OR 1b, not both. a		$E[T] = 5 \times 1321 = 6605 \text{ g}$ $\sigma T = \sqrt{5} \times 169.7 = 379.4607358 \text{ g}$ $z = 1.96$ or 1.9599 6605 ± 743.7 4304121 or $5861.253968 < T < 7348.7430421$ e	Accept any rounding of at least 2 sig fig. Accept interval written in equivalent forms. Ignore units.	BOTH 1(b) both parts AND 1(c) for Excellence.

2(a)(i)	41.3 ± 0.349 or $40.951 < \mu < 41.649$ (GC: $40.951 < \mu < 41.648$) $z = 1.65$ or 1.645 or 1.6448 Accept $[41, 42]$ a			Accept any rounding of at least 2 sig fig. Accept interval written in equivalent forms. Ignore units.	2(a)(i) AND 2(a)(ii)
2(a)(ii)	0.15625 ± 0.125805 or $0.030445 < \pi < 0.282055$ $z = 1.96$ or 1.9599 (GC: $0.030447 < \pi < 0.28205$) Accept $[0.030, 0.28]$, $[0.03, 0.28]$ a		Merit	Accept any rounding of at least 2 sig fig. Accept interval written in equivalent forms. Ignore units.	for Achievement.
2(b)		$2.576 \times \sqrt{\frac{0.5 \times 0.5}{n}} \leq 0.15$ $n > 73.7308444$ Therefore minimum sample size is 74 kiwi. or Accept CAO = 74 m		Must round up to whole number.	Either 2(a)(i) or 2(a)(ii) AND 2(b) for Merit.
2(c)	1.775 < μ_X < 2.285 or $42.6 < T < 54.8$ Not both used as replacement for 2a(i) ONLY Note: $1.8 < \mu_X < 2.3$ Gives $43.2 < T < 55.2$ Accept $[43, 55]$ a a	Merit evidence for 2(b) only	Let X = territory size $E(X) = 2.03$ $SD(X) = 0.62$ 90% C.I. for μ_X : $z = 1.65$ or 1.645 or 1.6448 2.03 ± 0.255 $1.775 < \mu_X < 2.285$ Let T = total area needed 90% C.I. for T : $42.6 < T < 54.84$ Since 90% CI values are all less than 65 ha , it is likely the island size would be sufficient based on this sample. e	Excellence Interval for total area AND suitable statement needed (need the two highlighted parts). Accept variations in calculations that are due to rounding.	Both 2(b) AND 2(c) for Excellence.

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Calculate confidence intervals for population parameters.	Demonstrate an understanding of confidence intervals.	Demonstrate an understanding of the theory behind confidence intervals.
2 a	2 M	1 M + 1 E
in either question	<i>OR</i>	
	1 A + 1 M	

The following Mathematics-specific marking conventions may also have been used when marking this paper:

- Errors are circled.
- Omissions are indicated by a caret (^).
- **NS** may have been used when there was not sufficient evidence to award a grade.
- **CON** may have been used to indicate 'consistency' where an answer is obtained using a prior, but incorrect answer and **NC** if the answer is not consistent with wrong working.
- **CAO** is used when the 'correct answer only' is given and the assessment schedule indicates that more evidence was required.
- **#** may have been used when a correct answer is obtained but then further (unnecessary) working results in an incorrect final answer being offered.
- **RAWW** indicates right answer, wrong working.
- **R** for 'rounding error' and **PR** for 'premature rounding' resulting in a significant round-off error in the answer (if the question required evidence for rounding).
- **U** for incorrect or omitted units (if the question required evidence for units).
- **MEI** may have been used to indicate where a minor error has been made and ignored.